The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1- 24 (canceled)

25. (currently amended) A method for characterizing tissue in medical images for use in disease diagnosis and detection comprising:

computing an information object hierarchy of increasing complexity to characterize anatomical tissue, the object hierarchy containing models based on characteristics an image acquisition device and anatomical characteristics of at least one given disease, wherein the hierarchy comprises a low level corresponding to signal models representative of the image acquisition device and a high level corresponding to anatomical models derived in accordance with expert observation and knowledge of the at least one given disease;

comparing information by performing Bayesian competition using Bayes Factors at respective levels of the object hierarchy to identify suspicious tissue indicative of disease, wherein the Bayes Factor is a ratio of posterior model probabilities given intensity and shape data for two given models M=1 and M=2, and where x=intensity data, θ_1=geometric model for M=1 and θ_2=geometric model for M=2 and is expressed as:

$$\frac{p(M=1\,|\,x,\theta_1,\theta_2)}{p(M=2\,|\,x,\theta_1,\theta_2)}.$$

26. (original) The method of claim 25 wherein the anatomical characteristics are at least one of geometric shape and intensity values.

27. (original) The method of claim 25 wherein the object hierarchy further comprises a plurality of signal models based on characteristics of an image acquisition device used in acquiring the images and plurality of models based on anatomical characteristics of a selected region of interest and the at least one given disease.

28. (canceled)

29. (original) The method of claim 25 further comprising a plurality of intermediate levels defining geometric models, shape models, intensity models derived from the anatomical models at the high level.

30. (original) The method of claim 25 where the at least one given disease is lung disease.

31. (currently amended) The method of claim ~~28~~ 25 wherein the anatomical models at the high level correspond to lung nodules indicative of lung disease, vascular structure and lung matrix tissue.

32. (original) The method of claim 31 further comprising a plurality of intermediate levels defining shape models and intensity models characteristic of lung nodules.

33. (original) The method of claim 31 further comprising a plurality of intermediate levels defining shape models and intensity models characteristic of lung vascular structure.

34. (canceled)

35. (currently amended) A system for processing medical images acquired by an image acquisition device for use in the detection and diagnosis of disease comprising:

a processor coupled to the image acquisition device, the processor is adapted to identify suspicious regions within the medical images based on an information object hierarchy and a Bayes Factors competition framework using at least one of anatomical models and signal models; and,

an interface coupled to the processor adapted to present information relating to the suspicious regions identified by the processor, the information being used for diagnosis and detection;

wherein the Bayes Factor competition uses the Bayes Factor, the Bayes Factor being to a ratio of posterior model probabilities given intensity and shape data for two given models M=1 and M=2, and where x=intensity data, θ_1=geometric model for M=1 and θ_2=geometric model for M=2 and is expressed as:

$$\frac{p(M=1 \mid x, \theta_1, \theta_2)}{p(M=2 \mid x, \theta_1, \theta_2)}$$

36. (original) The system of claim 35 wherein the anatomical models comprise at least one of lung nodules and vascular structure indicative of lung disease.

37. (original) The system of claim 35 wherein the hierarchy comprises models of increasing complexity for use in identifying suspicious regions.

38. (original) The system of claim 35 wherein the interface is further adapted to receive user queries regarding an anatomical context of the suspicious regions and a decision process for identifying each of the suspicious regions.

39. (original) The system of claim 35 wherein the signal models comprises at least one of a scanner point spread function, the impulse response of the image acquisition device and the X-ray density, brightness, resolution and contrast of anatomical structures.

40. (original) The system of claim 35 wherein the image acquisition device is selected from at least one of a computed tomography (CT) scanner, a magnetic resonance imaging (MRI) scanner, an ultrasound scanner, and a positron emission tomography scanner, and a X-ray device.

41. (canceled)

42. (original) The system of claim 35 wherein the processor is further adapted to automatically segment the pleural space.

43. (original) The system of claim 35 wherein the processor is further adapted to group a plurality of anatomical and signal models into the hierarchy of models for use in the competition framework.

44. (original) The system of claim 35 wherein the medical images are acquired of at least one of a lung, a colon, a breast, a brain and a limb.

Claims 45-58 (canceled)